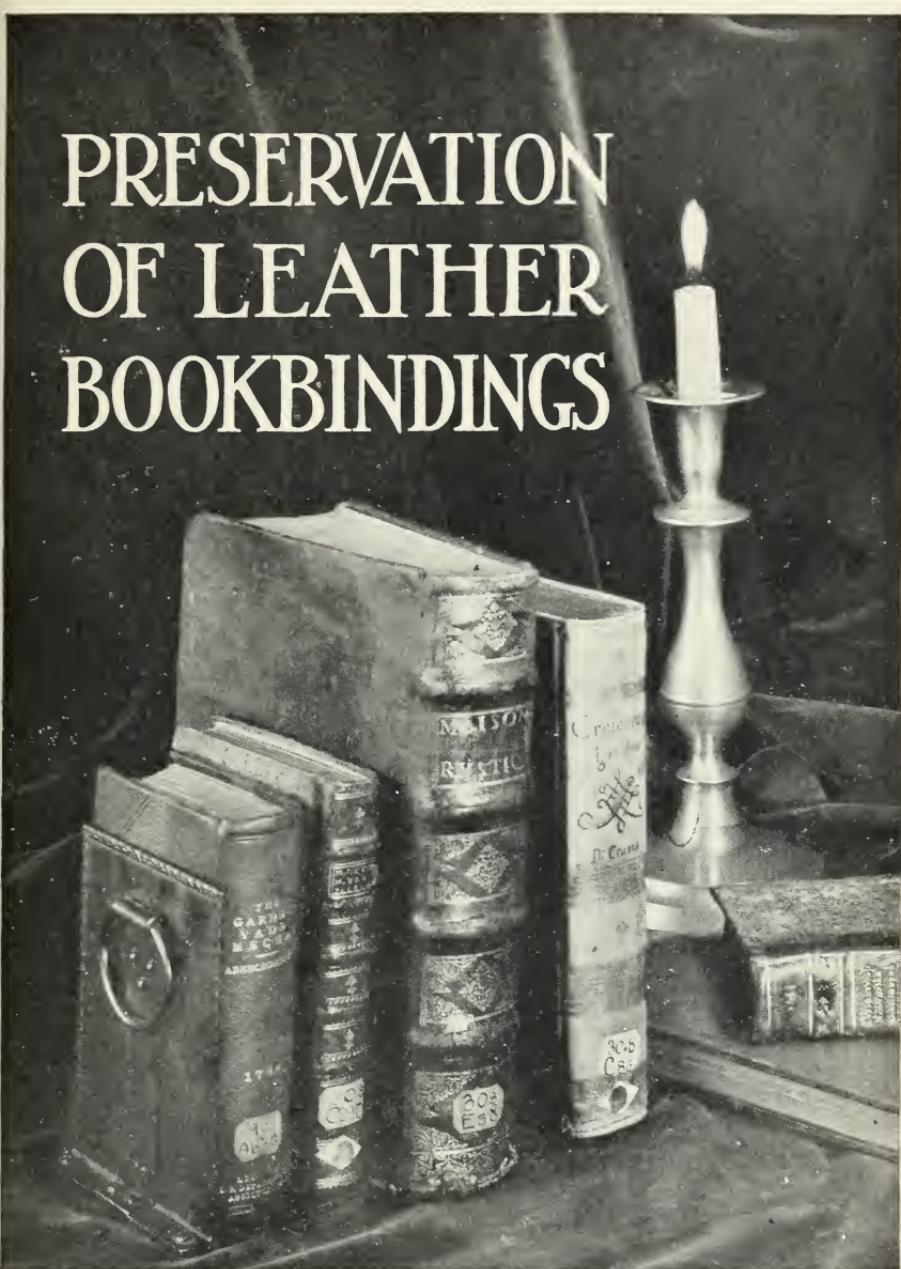


Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



PRESERVATION OF LEATHER BOOKBINDINGS



LEAFLET



NO 69

Issued November, 1930

Slightly revised April, 1933

PRESERVATION OF LEATHER BOOKBINDINGS

By R. W. FREY, *Chemist*, and F. P. VEITCH, *Principal Chemist in Charge, Industrial Farm Products Division, Chemical and Technological Research, Bureau of Chemistry and Soils*

Rotting of Leather Bookbindings

Millions of leather bindings in public and private libraries of this country are in various stages of decay. Some may show little, if any, sign of decay; others can be scratched easily and have worn corners



Scuffed, powdery, cracked leather bindings, starving for nourishment, are a familiar sight in every library

and slight cracks. Many are badly scuffed, powdery, and dusty, and are broken through along the hinges. They must be rebound to be serviceable. Frequent rebinding because of rapid deterioration is an item of great cost to libraries and to owners of books.

A long life is expected of leather bindings and this expectation should be realized if the leather is properly tanned and the bindings properly cared for. Of the several causes that contribute to the rotting of leather bindings, one almost invariably is lack of sufficient oil or grease in the leather. The timely application of dressings containing suitable oils and greases will add many years to the service of a leather binding. Such dressings lubricate the fibers, thus imparting flexibility and strength to the leather. They also protect the fibers by rendering them less absorptive and more impervious to the harmful gases that usually are in the air.

It is not possible with dressings or other treatments to restore, in the strict sense of the word, the original good properties, life, or fiber of a piece of rotted leather. Consequently, the proverbial ounce of prevention is essential if the maximum serviceability is to be obtained. Treatment should be started when the bindings are new and should be repeated periodically, once every year or two. When treatment is postponed, as is so often the case, until the leather shows signs of decay, it is too late to preserve the binding in prime condition. Even at this stage, however, treatment will retard further rotting and so prolong the life of the binding.

Dressings for Bindings

Quick, direct, and positive tests of the efficacy of different dressings and materials in preserving leather are not possible because of the relatively long time that is required for the natural aging and deterioration of the leather. The Bureau of Chemistry and Soils, over a period of many years, has devoted much study to the causes of and means for preventing the deterioration of leather, including the examination of many naturally deteriorated leather bindings and other leather articles, experiments on the effect of oils and greases on leather, and the critical analysis of conditions that promote deterioration. On the basis of this experience and of existing knowledge about the effect of various oils and greases on leather many dressings for the preservation of leather have been compounded from time to time. Among those that have appeared good are the preparations tabulated below.

Preparation 6 was developed by the New York Public Library and has been used systematically by that institution for several years. It is easily prepared and applied and gives good results.

Preparation 7, or purified vaseline, has been used during the past 20 years by the Worcester County Law Library, Worcester, Mass., on its law books.

It is important that the materials used to make the preparations be of the best quality and practically pure; consequently, materials of United States Pharmacopoeia grade, or of the same quality, should be used. These can be obtained at or through local drug stores, chemical supply houses, wholesale drug supply establishments, or commercial chemical laboratories. Makers of the various ingredients are listed in commercial registers under the particular product desired.

These dressings are not difficult to make, but if so desired, arrangements probably can be made with a local pharmacist or commercial

chemist to prepare them. All the formulas are expressed in per cent by weight.

Preparation 1		Preparation 4	
Neat's-foot oil, pure, 20° C. cold test	25.0	Lanolin, anhydrous	55.0
Lanolin, anhydrous	17.5	Sperm oil, winter strained	25.0
Japan wax, pure	10.0	Japan wax, pure	15.0
Sodium stearate, powdered	2.5	Sodium stearate, powdered	5.0
Water, distilled	45.0		
Preparation 2		Preparation 5	
Lanolin, anhydrous	30.0	Neat's-foot oil, pure, 20° C. cold test	50.0
Castor oil	12.0	Castor oil	50.0
Japan wax, pure	5.0		
Sodium stearate, powdered	3.0		
Water, distilled	50.0		
Preparation 3		Preparation 6	
Lanolin, anhydrous	50.0	Lanolin, anhydrous	40.0
Neat's-foot oil, pure, 20° C. cold test	35.0	Neat's-foot oil, pure, 20° C. cold test	60.0
Japan wax, pure	10.0		
Sodium stearate, powdered	5.0		
Preparation 7		Preparation 8	
Petrolatum or petroleum jelly, purified	100.0		

When making the preparations the ingredients should be melted or dissolved by heating them on a steam bath or in a double boiler. Scorching or burning is likely to result from heating directly over a flame.

Preparations 1 and 2 are emulsions with water and can be made in the same way. Melt together in one container all the ingredients except the sodium stearate and distilled water. Mix the sodium stearate and the water in another container. Cover this container, and heat slowly and gently until the stearate is dissolved. Then pour the sodium stearate solution in a thin stream into the melted grease while stirring it vigorously. A thin milklike mixture will result. Let this cool. When the mixture is about cold it will be noticeably stiffer and from this stage on it should be constantly and thoroughly stirred until uniform in appearance. If properly made, these dressings will be very smooth, ointmentlike, nearly white to pale-cream preparations without any separation of water. If the emulsion separates into two layers, it can be restored by vigorously stirring or whipping the mixture when it is cold. These preparations should always be kept in a container with a tight-fitting cover to prevent evaporation of water and consequent drying and hardening. Glass screw-cap jars, such as are used frequently for vaseline, ointments, and cold creams, make convenient receptacles.

Preparations 3 and 4 are made by heating the specified ingredients together in one vessel until all but the sodium stearate powder have melted. The mixture is then poured on a smooth, nonabsorbing surface, such as a piece of plate glass or a marble, stone, or glass topped table, and worked with a spatula as it cools. The small white particles of sodium stearate are "rubbed in" with the spatula and thoroughly worked into the other ingredients until a salvelike mixture, perfectly uniform in appearance, and without any lumps or

white specks, is obtained. It is essential to work in the sodium stearate as described.

Preparation 5 is simply a mixture of equal quantities of neat's-foot oil and castor oil.

Preparation 6 is a soft salve. To make it, warm the lanolin slowly until it is melted, then add the neat's-foot oil, stir thoroughly until the mixture is uniform, and let it cool.

Preparation 7 is simply purified petroleum jelly or vaseline of a high grade, equal in quality to that for medicinal use. It should be nearly white or but faintly yellowish and practically without odor or taste. A water extract made by vigorously shaking some of the petrolatum with a small quantity of hot distilled water should be neutral to litmus, showing the absence of acids or alkalies.

Application of Dressings

At the outset it should be realized that any oil or grease will darken to some extent law, tan, and other light-colored leathers and may slightly dull the finish even though the color be black. This will happen even with colorless or snow-white dressings because the leather absorbs more light after being oiled.

Good judgment should be used in applying oils, greases, or dressings to leather bindings. Care should be taken not to put on so much that the leather will remain greasy to the touch, yet enough should be applied to oil the leather well. Only a thin film of the dressing should be applied at a time. Repeated applications of small quantities should be made until the leather is well oiled. Intervals of several hours should elapse between applications to enable the leather to absorb the oil or grease. The back and hinges of a binding usually rot more rapidly than the sides, and consequently more oil and grease should be applied to these parts. This should be done especially when treating bindings that are already beginning to show decay. In order to increase the rapidity with which leather absorbs oils and greases, as well as the actual quantity it can absorb without remaining greasy, bindings should be put in a warm, but never a hot, place for an hour or two after oiling. The temperature should be about 100° to 115° F.

Dressings are best applied with the fingers and palm of the hand. Use a firm, rapid stroke and spread the dressing over as much of the leather at one time as is feasible, in order to distribute the oil and grease uniformly. The dressing should be rubbed well into the leather and not merely smeared on it. It is the oil that gets into the leather, and not simply on it, that counts. If it is not desired to use the hand, a small swab of cheesecloth, chamois, felt, or other suitable material may be employed.

The New York Public Library recommends that their preparation be applied by means of a flat varnish brush of appropriate size. Take care to apply the dressing only to the leather. After treatment let the binding stand for a few hours, or overnight, until the oil is absorbed. Then polish with a soft cloth. If an added polish is desired, apply a small quantity of castor oil with a soft cloth and polish with a chamois or sheep's-wool polisher.

The Worcester County Law Library advocates heavy application of petrolatum in one or two coats until the leather is practically

saturated with the grease. The petrolatum is most effectively applied with the palm and fingers of the bare hand, working it well into the leather by firm and persistent rubbing.

As a rule, the smoother, harder, and more shiny the finish of the leather, the less oil and grease it will take up without becoming greasy. Sheepskin bindings will usually absorb the most oil and will be most discolored, and Morocco or other goatskin bindings the least. Cowhide and calfskin bindings are intermediate in this respect.

Dry, porous bindings that show a tendency to peel or to be powdery are almost impossible to oil uniformly. Leather in this condition is very absorbent and literally grabs the oil as soon as contact is made with it. After such bindings are oiled, areas of the leather having unequal depth of color are almost inevitable, and the middle part of the back between the hinges will be darker than the leather on each side unless the binding was originally very dark or black.

In dressing bindings in such a condition and indeed all very absorbent bindings, a more even distribution of oil probably can be obtained with preparations 1 and 2 because they are about one-half water. Bindings in a relatively sound condition, that is, with the grain of the leather intact and not powdery, scuffed, and cracked, may be treated quite satisfactorily with pure neat's-foot oil or with a simple mixture of neat's-foot oil and castor oil, such as preparation 5.

Treating Vellum Bindings

Much of the dirt on soiled vellum bindings can be removed with preparation 1 or 2 by firmly rubbing the vellum with the dressing on a small cloth swab. However, this will not remove the yellow discoloration of old vellum, which extends well into the skin and often through it. After the binding has been cleaned, a final very light coat of the dressing should be applied, as vellums usually take up but little oil or grease.

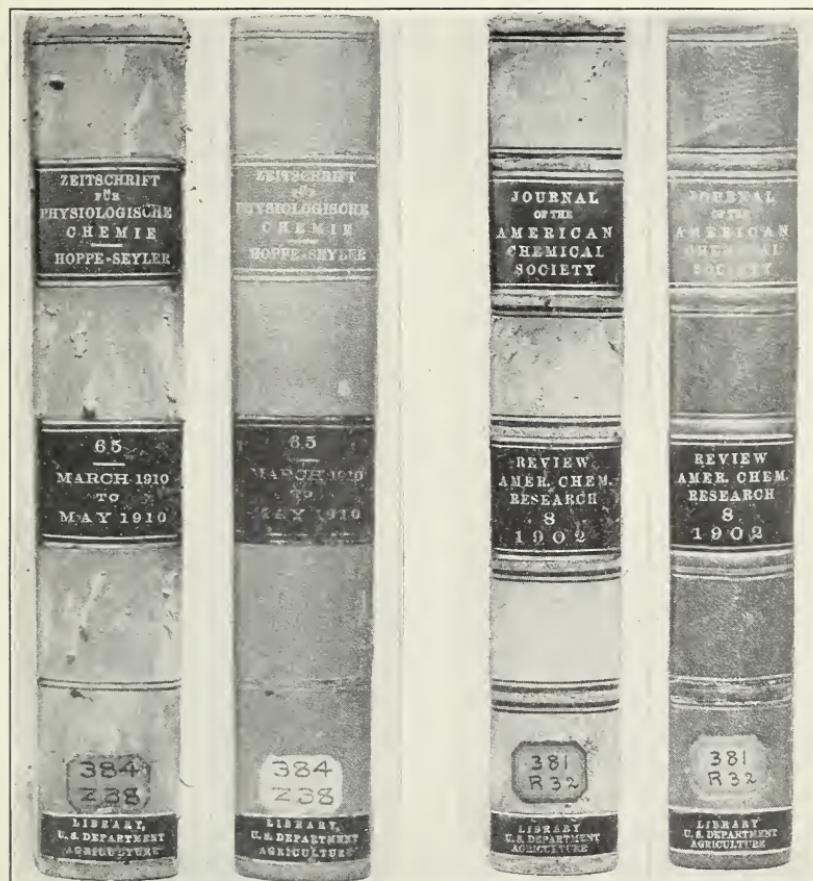
Lacquering Powdery Bindings

Many bindings in the advanced stages of decay or rot become powdery and are disagreeable to handle, soiling the hands and clothes with leather dust. Old law sheep bindings in this condition probably are the most familiar examples, but many bindings made from other kinds of leather peel and get powdery. Such bindings are on their "last legs," but they can be improved materially by treatment with a dressing followed 24 to 48 hours later by lacquering with a cellulose-nitrate lacquer. The leather should be well oiled or greased because it can not again be oiled after being lacquered. Care should be taken, however, not to put on so much dressing that the surface of the leather remains greasy as the lacquer then will not adhere.

If the surface of the leather is powdery and scuffed, a better result is often obtained by rubbing it smooth with crocus cloth or very fine emery cloth before the oiling and lacquering.

A thin cellulose-nitrate or soluble-cotton lacquer should be used. If the lacquer is too thick, a highly varnished appearance results and the lacquer is more likely to come off. There are on the market cer-

tain types of ready-made cellulose-nitrate lacquers, which may be used if sufficiently thinned with their respective thinners. Lacquers made for leather, cloth, and similar flexible materials should be used, and not those intended for metal and wooden surfaces. The lacquer should not contain any gums or resins and preferably should have a high percentage of castor oil as softening agent or plasticizer.



Old bindings before and after oiling and lacquering

A lacquer that may be used for this treatment has the following composition, the weights being given in ounces avoirdupois:

Cellulose-Nitrate Lacquer

Cellulose nitrate, one-half second, for lacquers, ready mixed, with 30 per cent by weight of alcohol

1

Monoethyl ether of ethylene glycol

2

Ethyl acetate

3

N-butyl alcohol

1

Toluene

5

Xylene

2

Castor oil, U. S. P.

1/2

The first four ingredients are put in a glass fruit jar, or other suitable container, which is then tightly closed and allowed to stand with occasional shaking or stirring until a clear, thick sirup is obtained. The last three ingredients, mixed together, are then added in a thin stream with constant stirring until a uniform mixture results.

Dry cellulose nitrate or pyroxylin is dangerous to handle and ship. Consequently, it is usually sold, shipped, and kept mixed with 30 per cent by weight of alcohol. Every precaution against fire and explosion should be taken when using cellulose-nitrate lacquers. Since these lacquers dry rapidly, they give off in a short time a relatively large volume of vapors and fumes, which ignite easily and burn freely, and which consequently should not be allowed to accumulate in the room or place where the lacquering is being done. Furthermore, the vapors may have a disagreeable odor and be irritating to some persons. The lacquers should be applied preferably in the open or at least in a free circulation of fresh air. They must not be used near a fire or open flame, or while the person handling them is smoking.

A soft brush, about 1 inch wide, with hairs set so that they will not be loosened by the lacquer, should be used. The lacquer should be flowed on with only one or two strokes and not worked out by brushing back and forth, as this causes the lacquer to roll up. The brush should always be full of the lacquer. Sometimes more than one coat is needed, but in such instances, let the first coat dry before applying the second one. The brush should either be kept suspended in the lacquer or cleaned in acetone or a thinner immediately after it is used if it is to be preserved for future use. The lacquers are very volatile and must be kept tightly sealed when not in use.

Sometimes these lacquers partly dissolve and consequently spread the dye in title skivers, especially black skivers. This can be avoided by carefully putting the lacquer over the titles with one stroke of the brush.

Lacquered bindings will have a slightly shiny finish. Whether or not this is objectionable will depend upon individual taste.

Damage to Bindings and Books from Various Causes

Occasionally leather bindings and books are damaged in unusual ways. General directions for renovation, if renovation is possible, can hardly be given. Each case requires individual consideration. The Bureau of Chemistry and Soils will be glad to offer suggestions, and helpful information can also be obtained from the Library of Congress, Washington, D. C.

